

## Employee Attendance Monitoring System by Applying the Concept of Enterprise Resource Planning (ERP)

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### Abstract

Enterprise Resource Planning (ERP) is a business process management system that integrates and automates the activities of an organisation in terms of its technology, human resources and services. ERP provides an integrated environment that links the business processes of different departments of an organisation into one unit so that departments benefit from each other through their joint transactions. This study applies the ERP concept to create an employee attendance monitoring system (EAMS). Three departments, HR, Finance and the Director of Administration, were linked using the EAMS. The traditional system of attendance monitoring was time consuming and required greater effort. This is because the attendance report needed to be printed from the HR department and then sent to the Finance Department for any necessary actions (i.e. salary deduction). The EAMS will automate the whole process, thus resulting in fair decisions in less time. In the traditional system, the any delay in calculations of attendance can be unwarranted or maintaining an accurate time record can be difficult as it is manually updated. To solve these issues, a computer based monitoring system is required to establish accuracy and fairness. For that purpose, we designed and developed the EAMS. The EAMS automatically calculates any delay in employee attendance using the concept of ERP systems. More precisely, this system will calculate the delay in the attendance within set rules, as defined and applied

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by the different departments in the organisation. The attendance times will be checked automatically by the system: if there is any delay which violates the set rules of the organisation, necessary action will be taken automatically against the employee in terms of salary deduction or other notifications. To apply the EAMS, we constructed a case study at the “Faculty of Economics and Business Administration at King Abdulaziz University, (Female Section)”. Later, it is hoped, that this system can be used in other organisations based on their needs and enhancement to the existing framework. The expected results of this system are that it will save time and effort for all employees at the Faculty of Economics and Administration. In addition, there will be a reduction of errors in the attendance reports.

**Index Terms:** Enterprise Resource Planning, linking process, Attendance System, organisations, integrated system.

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## 1. Introduction

In modern management methods of information technology Enterprise Resource Planning (ERP) has become, not only a utility, but a complete application based on the compilation of information and processes of the organisation into a single system that has many procedures and devices contained in its single database. The goals of ERP basically refer to how the facility can use planning and maximise the use of its resources [4], [12]. Define an ERP system as a commercial and configurable software package that manages and integrates of all the information flowing through the functional areas in the organization i.e. financial, accounting, supply chain and customer information, sales and distribution, production planning, materials management and human resources management.

The ERP system can usually cover a wide range of jobs and is brought together into a single database such as human resources [ HR], Supply Chain Management [SCM], Customer Relationship Management [CRM], financial, inventory management, purchasing, sales and production projects [11].

Every function of the previous department is based on a separate application but these are brought together into a single network and a single database, and this makes up the ERP System. An ERP system depends on the collection of data and processes from all departments of the organisation which are then standardised into a workflow to create one huge database and employ multiple different departmental programs to configure the output based on correct and complete information. There are several companies and universities in Saudi Arabia that have adopted an ERP System, for example, Dallah Albarkah Company and King Saud University (KSU) [1].

This study researches how to create a system to calculate the delay time for employee attendance in the Faculty of Economics and Administration, Female Section at King Abdul-Aziz University, and then to integrate this with the employee department and the Director of Administration by applying the concept of Enterprise Resource Planning (ERP).

## 2. Literature Review

This section explores previous work covering the most 7 systems of enterprise resource planning (ERP) system, therefore providing a clear understanding for the technology used in employee attendance monitoring system. There are many previous works such as the following:

### *2.1 SAP Human Capital Management (SAP HCM)*

SAP ERP HCM integrates with a company's current business systems and can be fully personalised to meet that company's needs. It is because of this that over 10,000 companies in over 110 countries worldwide use SAP ERP HCM to manage a combined total of more than 60 million employees [8].

The key modules, such as Organisational Management consists of employee training, staff budgeting and event management, Time management is made up of tasks such as time keeping and attendance, rotas, annual leave, etc. , Personnel Administration is concerned with includes individual and organisational structures and combines with Time Management and Payroll, Payroll is responsible for tax details (gross and net pay), pensions, bonus payments, increments, etc. , Recruitment deals with job specifications, advertisements, interview preparation, holding interviews, hiring an employee and maintaining their HR file, etc., Training and Event Management consists of recognising the need for training and putting together programmes to facilitate this: tasks include deals with identifying training needs, timetabling training, budgets, identifying suitable trainers, etc. , and Travel Management is where business trips are booked, budgeted for, and costs are claimed for reimbursement.

### *2.2 Anjez System*

In King Abdulaziz University the ERP system used is the Anjez System. It is a multi-function system which incorporates institution-wide data and operations into a single application. ERP systems constitute many elements, such as hardware and software, to comply with their multiple requirements. A standardised evidence base is necessary for storage resource planning in order to identify the many different tasks carried out across the organisation so they can be included in the system build [2].

The Anjez System consists of many functions and all of these functions are integrated with each other [2]. The main tasks that are performed under Anjez System such as, Employee personal file, Rosters and rules relevant to them, Diary for public holidays and entitlement regulations, and Absence reports.

### *2.3 Mobile Based Attendance Management System*

The objectives accomplished through use of this approach include automating the participating administrators' use of cell phones to diminish the conditions on regular assets and to provide a method for correspondence amongst guardians and educators, incorporating the understudy's cell phones with the application so that the application readily identifies the students that are available is an incredible asset that could be included in the future [6].

This consists of incorporating the system with the school/school server so that the server will send an SMS to the relevant person of the student's non-attendance and will update them about their ward. There will also be a day by day report produced that will be submitted to the incorporated server for its records [6].

The framework is executed on a S60 Symbian stage. All Symbian based cell phones (i.e. S60 Nokia telephones or some other gadget fit for purpose. sister records) are upheld by the framework. Symbian OS is a C++-based framework. Consequently, to bolster the local OS, C++ turns into the real programming dialect. Additionally, Java (potentially J2ME), which reliably provides stage autonomous answers for engineers, can likewise be an option. QT dialect is utilised to build up the framework since it makes use of the idea of 'compose once'; incorporated for n which is quicker than any Java based applications [6].

### *2.4 Attendance Management system (Android App Development)*

The android application will be used to ascertain the participation of the students in universities and refreshing the outcomes directly into the school server. The information will be stored in the PDA if there is

no internet immediately accessible. When the web connection is accessible, and then personnel can login into their school record and update their participation results [7].

The method proposed for the application created for android OS is 'user friendly'. This allows faster access to data and also less memory storage capacity. The application does not need any guidance for an inexperienced user to use it [7]. It is an efficient method to store attendance details in the smart phones rather than wasting paper. It also updates the students' reports directly on to the server, reducing the faculty's time for logging on to the computer [7].

### *2.5 Employee Attendance System*

Employee Attendance System (EAS) is a simple Windows-based attendance system that has been specifically developed for small and medium companies. This software application can manage the recordings, controlling and monitoring of employee absences. The administrators can easily trace employees' attendance records compared to manual paper records and file keeping systems. Also, the employees' records are more secure when they saved onto the database [3]. The main purpose of an EAS is to help administrators to manage recordings, monitoring and tracking the attendance of the employees. It also provides an accurate time management system for the employees in order to simplify signing in and signing out their attendance [3].

### *2.6 The development of the web-based Attendance Register System (ARS) for higher academic institution*

This study focuses on the development of a web-based Attendance Register System, known as an ARS. The improvement of this framework is proposed because the students' participation records are one of the vital components that mirror their scholastic accomplishments in the higher education's establishments. In any case, the present practice used in a large portion of the higher education establishments in Malaysia is being misused by human mistakes and cheats. Helped by the System Development Life Cycle (SDLC) strategy, the ARS has been constructed through use of electronic applications, for example, PHP, MySQL and Apache, to provide the basis for the recording and updating of the students' attendance records. The motivation for this model framework came from the research carried out in University Technology MARA, Malaysia, where 550 respondents participated in surveys. From the investigation done, it was discovered that a more efficient and progressive framework demonstrates a definite improvement in the recording and reporting of the attendances in the university [5].

The top-end technology used to build this framework will give clients fast access to any data in regards to the students' attendances. Moreover, the framework can be effectively accessed through the Internet where it gives full support to concurrent multiusers from diverse areas. Other than that, the use of the database will also provide a secured and controlled information administration framework, which will expand the unwavering quality of the participation reports [5].

However, even though the current framework of ARS can add to the performance of recording students' attendance in higher education organisations, this model framework still requires future improvements. These improvements are still at an early stage where changes are encouraged in order to meet different aspects of the framework's procedures [5].

### *2.7 Mobile-based Attendance Management System*

The methodology of this system is to develop an android-based mobile attendance management system where attendance can be recorded via mobile devices using ASP, NET and SQL Server. This software stores, retrieves and delivers the information regarding student information, such as present or absent, through their

mobile device. Results obtained from this information are very helpful to the organisation for keeping track, and maintaining information, about students and is also easy to produce reports regarding the students to concern parents. Further this work can be extended to keep the student's information regarding internal marks, semester marks and other activities involved in the organization [9].

### **3. Methodology**

#### *3.1 Participants and Study Design*

An interview was held with the Director of Administration of the Faculty of Economics and Administration (Female Section) in King Abdulaziz University, to understand the current system and any problems that exist. Requirements for a new system were then discussed and noted. The questionnaire was carried out in a cost-effective way through use of an online questionnaire. Participants for this study includes employees who work in different areas, such as the Faculty of Economics and Administration, (Female Section) at King Abdul-Aziz University, in the HR Department, with administrators of some companies in areas such as general administration for quality, general administration of a Sales Department, a Director of Management Strategies and Quality Programs, a Director of a Direct Sales Department and a Director of a Capacity Building Program, also participants came from Jeddah Province Municipality in the Finance Department, and Dallah Albarakah Company in the Human Resource Department. The aim of this method is to investigate the main aspects of this study and whether the employees have any previous experience with using electronic attendance systems and if they have faced any difficulty with editing or updating attendance. It also lets them include suggestions to increase the efficiency of the process. The participants for this study were employees of both genders, and the sample consisted of a total of 230 respondents. The questionnaire was created using Google Drive "Google forms" and consisted of 13 questions which were distributed through social networking sites. A 3-item Likert-type scale ranging from 1 = Yes, 2 = No, and 3= a certain degree was employed. Questions from 1 to 6 are contained in table 1 related to ERP.

### **4. Results and Data Analysis**

The results of the questionnaire are presented in Table 1. . There were 230 participants who responded, and who work in different organizations. The questionnaire was created using Google Drive "Google forms" and consisted of 13 questions which were distributed through social networking sites.

### **5. Design and Implementation of the System**

This stage provides an insight into the actual Employee Attendance Monitoring System and how to convert the current manual attendance procedure into computerised attendance records. The ERP system should connect the employee, the HR Department and the Director of Administration together more easily and with greater flexibility towards attendance dates and should have an easy and friendly interface for its users. This is performed by showing the interface of the ERP website through presentation of screen shots of some of the website's pages. Also this stage covers the tools and applications used to build our system: including hardware; software; and programming languages. This section shows the ERP system structure (See Fig.1), and the ERP system model (See Fig.2).

Table1. the Participants Answers from the Questionnaire

QUESTIONS	Answer			
	YES	NO	To a certain degree	
1. Do you support the idea of creating a system that monitors employee attendance with possibility of payroll deduction under the administrative regulations of the facility?	58.3 %	16.2 %	25.5%	
2. Do you hear previously about this idea?	42.6 %	36.2%	21.3%	
3. What do you prefer for the attendance operation?	44.2%	25.8%	30%	
4. have you faced any problems if the system used for attendance operation at the facility was manual (paper based system)	28.4%	42.7%	28.9%	
5. Do you want to connect the system used for the employee attendance at the facility with other systems within the organisation?	54.1%	30%	15.9%	
6. Do you think the process of linking the system used for the employee attendance at the facility with other systems within the organisation helps control the attendance at the organisation effectively and accurately?	60.9%	17%	22.1%	
7. Do you think create an electronic system for employee attendance at the facility where you work helps a lot in issuing cumulative reports for employee movement (attendance, leave, absence, delay, etc.):	76.1%	6.8%	17.1%	
8. What are the reports that you need attendance system to generate for you? (Can select many answers)	Excuse report	Delay reports	Attendances report	Discount report
	71.6%	70.3%	60.3%	59.4
9. Do you prefer to use websites in Arabic or in English?	Arabic	English	English and Arabic	
	60.1%	6.4%	33.5%	

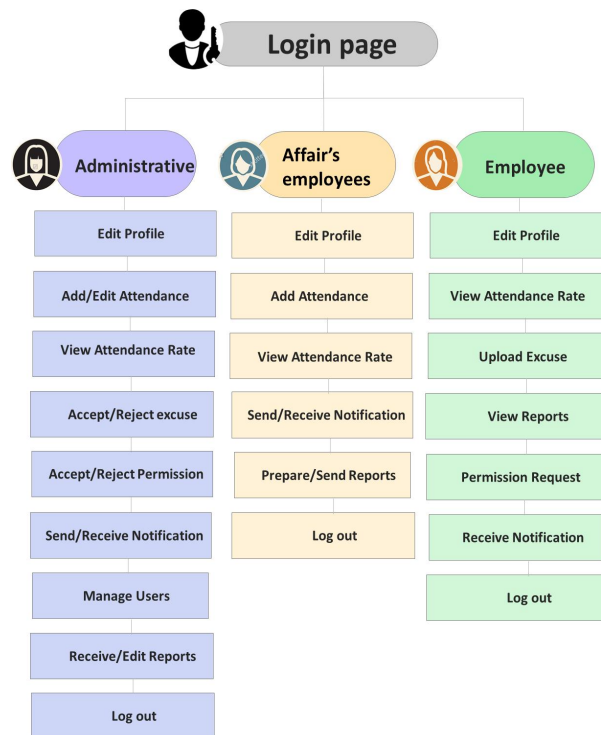


Fig.1. ERP features

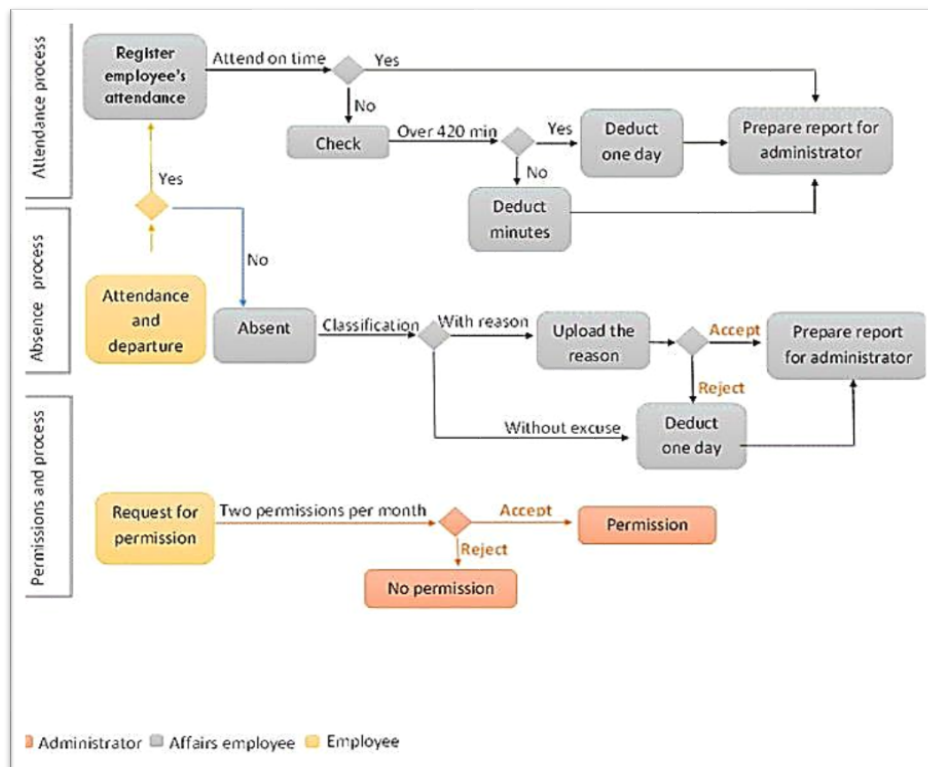


Fig.2. ERP work flow

## 6. Discussion & Conclusion

This study explores the conversion of the delay time for employee attendance in the Faculty of Economics and Administration, Female Section from a traditional method to an automated method. This was done by developing a computerized system and integrating it with the HR department and the Director of Administration by applying the concept of Enterprise Resource Planning (ERP). As ERP is a system for linking processes between a group of administrative departments, where each department benefits from data shared from other departments, so that the system works as a unified integrated (Integrated system), and operates with each other as an integrated whole across all sections and departments of the institution or faculty.

The most important objectives of this system are:

- Build an online attendance system for the Faculty of Economics and Administration, female section.
- Convert the delay time for employee's attendance from manually to electronically.
- Allow Director of administrative to extract and print monthly reports about employee's attendance.
- Enable employees to enter the necessary information about the Excuse of absences in no more 3 days.
- Allow the Director of administrative to update the delays time for the employees at single click.
- Allow the Director of administrative to deduct a day or hours from employee's salary. Send warning notification to the employee who does not upload the absent excuse.

- Interactive screens that easy to use, share and follow-up tasks with the ability to add attachments and comments.

Overall, employees and admin seemed to have enjoyed using the EAMS system and there seemed to have been a positive impact on performance of employees. The feedback from the employees and admin Survey suggests that the employees felt comfortable applying EAMS system in the workplace environment.

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